

A multi-species approach to evaluate the presence of polybrominated diphenyl ethers in the Puget Sound food web.

Sandra O'Neill, James West, Washington Department
of Fish and Wildlife*

Gina Ylitalo, NOAA Fisheries, Northwest Fisheries Science Center

Keywords: PBDEs, Puget Sound, fish, chinook salmon, food web

Concentrations of polybrominated diphenyl ethers (PBDEs) were measured in fish species representing a variety of life history traits to give a broad overview of contamination in Puget Sound. Our objectives were to determine to what extent PBDEs have infiltrated the benthic and pelagic food webs, and to assess potential exposure routes. A coarse assessment of PBDEs in the benthic food web indicated that PBDE concentrations in muscle tissue of English sole (*Parophrys vetulus*) were higher at urban sites compared to near-urban and non-urban sites. At one of these urban bays we also measured PBDEs in individual male quillback rockfish (*Sebastes maliger*) and individual female lingcod (*Ophiodon elongatus*) to assess biomagnification of PBDEs in species with different trophic status. PBDE concentrations were similar between English sole and rockfish from the same urban bay, despite rockfish's higher trophic status and greater age, but were considerably higher in lingcod, a high-level carnivore. Although PBDEs were not higher in rockfish than English sole, they did accumulate with age in male rockfish. Overall, PBDE concentrations in benthic species were lower than concentrations measured in whole body samples of Pacific herring (*Clupea pallasii*) from Puget Sound, and in sub-adult resident Chinook salmon (*Oncorhynchus tshawytscha*), indicating broad PBDE contamination of the pelagic food web. A comparison of concentrations of PBDE and PCBs in benthic and pelagic fish suggests that PBDEs accumulate faster in lipid rich pelagic species. Finally, we determined that PBDEs in mature Chinook salmon from Puget Sound were considerably higher than other Pacific Northwest free-ranging populations, suggesting a Puget Sound source of PBDEs.